

(12) UK Patent Application (19) GB (11) 2 286 572 (13) A

(43) Date of A Publication 23.08.1995

(21) Application No 9502451.9

(22) Date of Filing 08.02.1995

(30) Priority Data

(31) 9402403 (32) 08.02.1994 (33) GB

(71) Applicant(s)

Conveyor Units Limited

(Incorporated in the United Kingdom)

Sandy Lane, Tittton, STOURPORT-ON-SEVERN,
Worcestershire, DY13 9PT, United Kingdom

(72) Inventor(s)

Edward William Toye

(74) Agent and/or Address for Service

Forrester Ketley & Co
Chamberlain House, Paradise Place, BIRMINGHAM,
B3 3HP, United Kingdom

(51) INT CL⁶

B65G 13/07

(52) UK CL (Edition N)

B8A A4H2 A4JB

(56) Documents Cited

None

(58) Field of Search

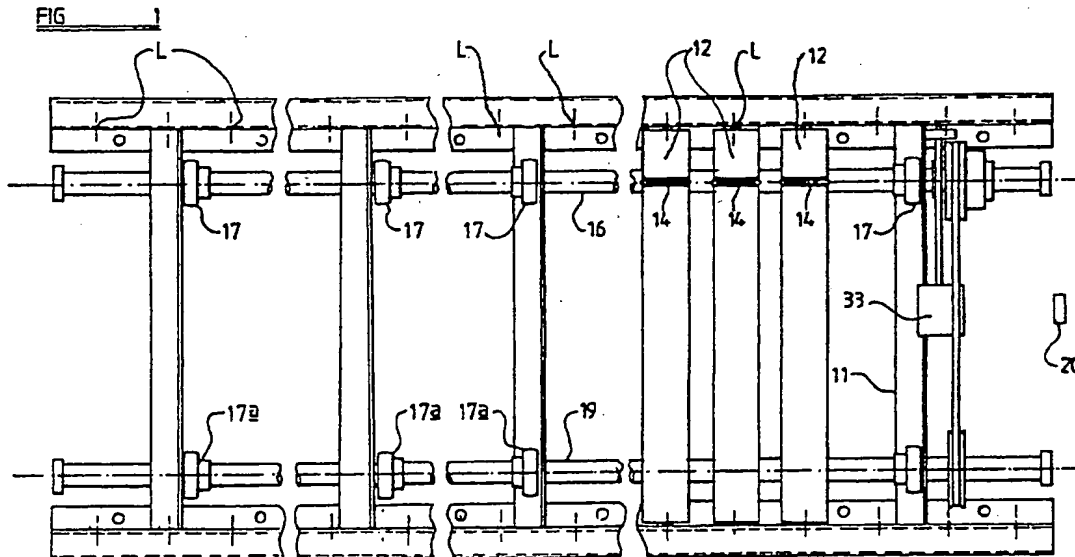
UK CL (Edition N) B8A A4JA A4JB

INT CL⁶ B65G 13/02 13/07 13/071

ONLINE:WPI

(54) Live roller conveyors

(57) A live roller conveyor comprising a plurality of rollers 12 driven by friction drives from a common drive shaft 19 wherein at least some of said rollers are driven from the common drive shaft through a secondary drive shaft 16 and there being control means 33 to vary the torque transmitted between the common drive shaft 19 and the secondary drive shaft 16.



GB 2 286 572 A

FIG 1

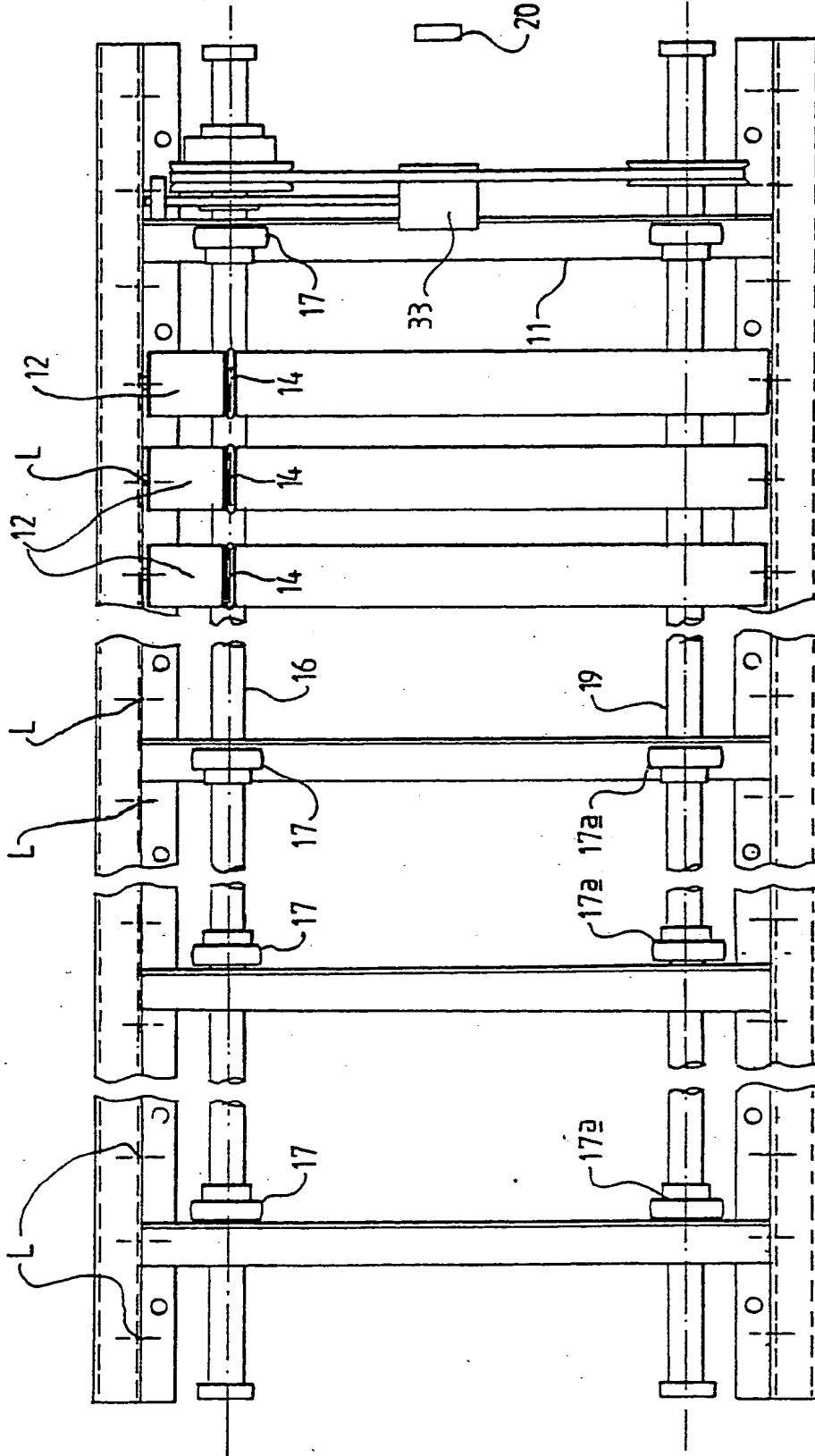
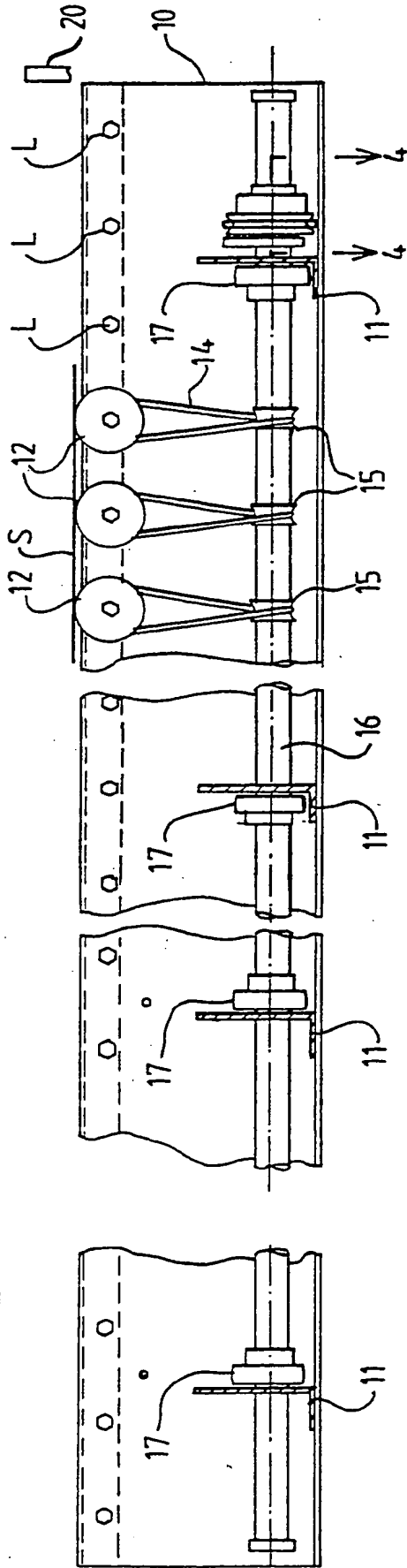


FIG 2



2 / 4

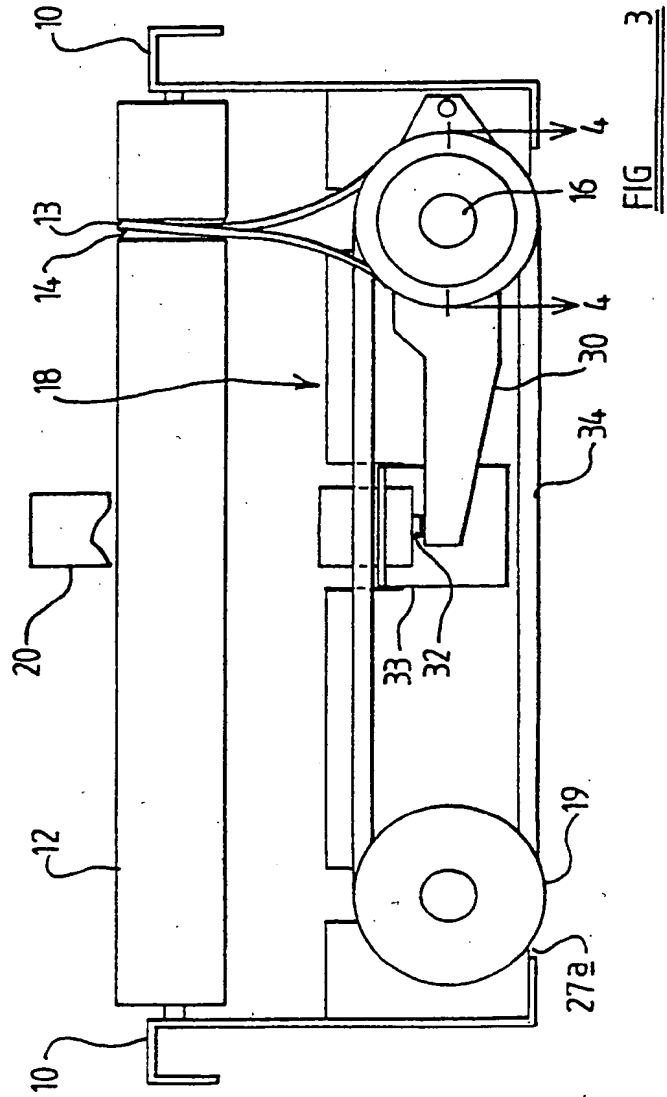


FIG 3

FIG 5

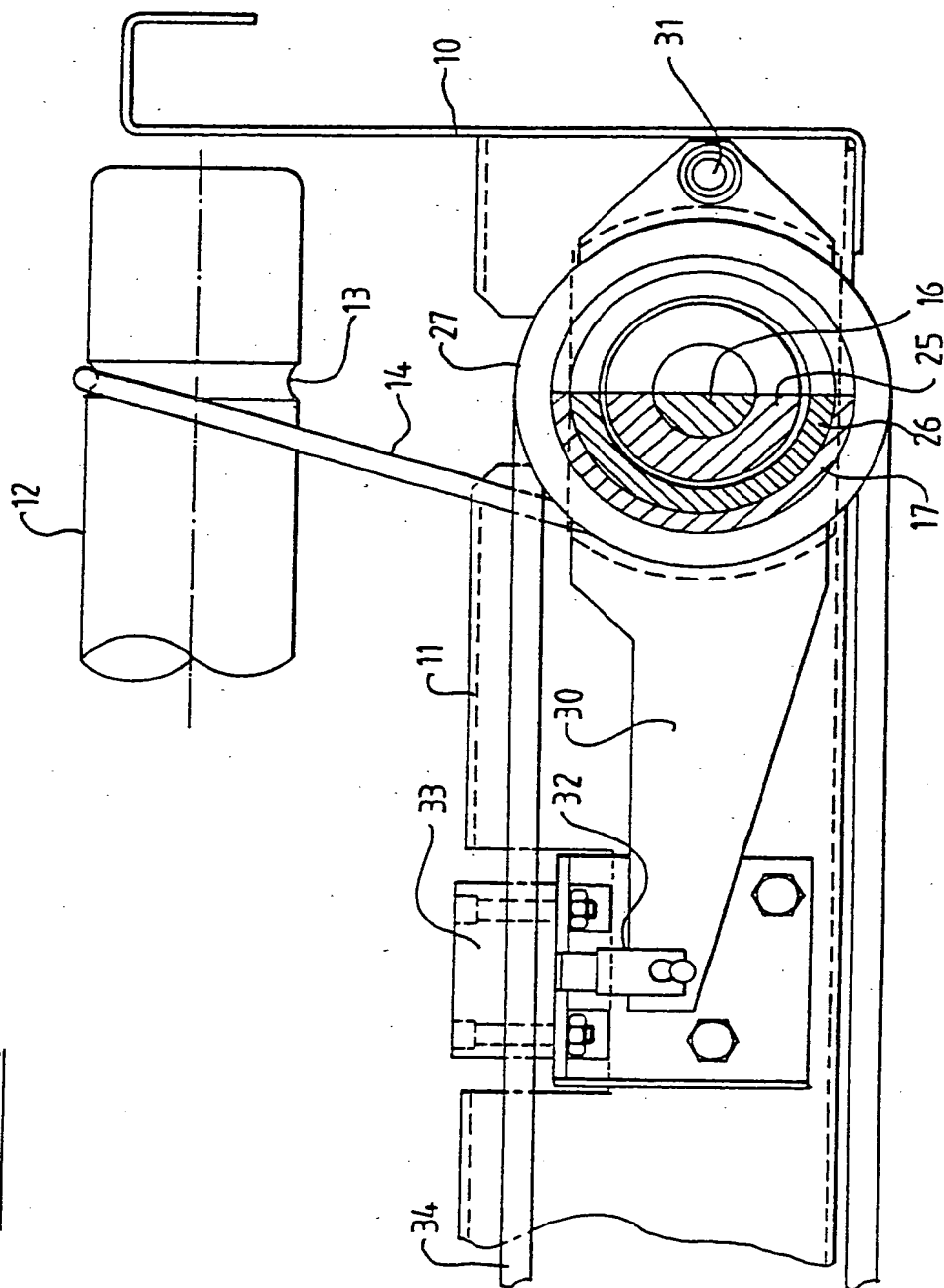
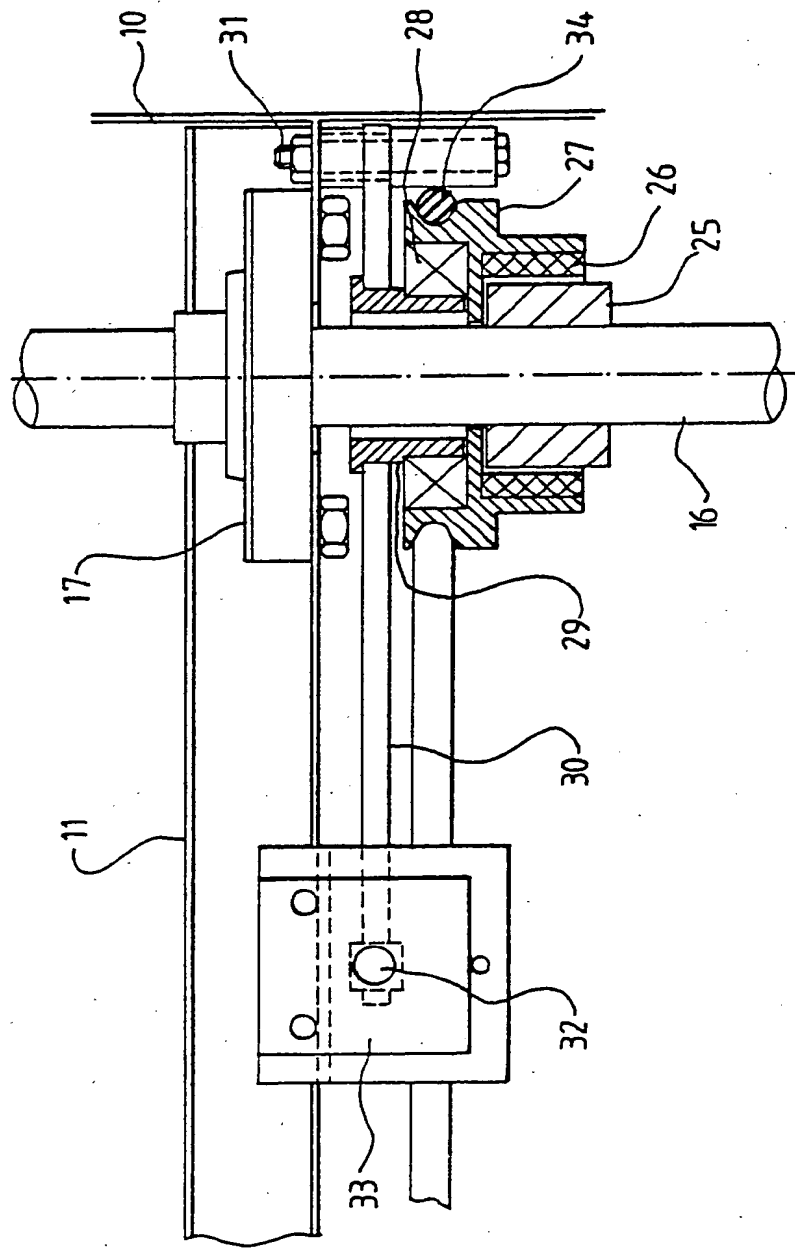


FIG 4



- 1 -

2286572

Title: "Improvements relating to live roller conveyors"

Description of Invention

This invention relates to a live roller conveyor comprising a plurality of rollers driven by friction drives from a common drive shaft.

Such a conveyor may be provided with a control means to permit of a drive force which is applied to an article being conveyed by at least some of the rollers to be adjusted so that, for example, when articles are accumulated on such a conveyor, such as by engagement with an arresting means at an arresting station, an undesirably high end load on the article and/or the arresting means may be avoided. Alternatively, conveyance of the article can be interrupted or otherwise controlled by adjustment of the drive force alone without the provision of an arresting means.

An object of the present invention is to provide a live roller conveyor having an improved control means for adjusting the drive force.

According to the present invention, we provide a live roller conveyor comprising a plurality of rollers driven by friction drives from a common drive shaft wherein at least some of said rollers are driven from the common drive shaft through a secondary drive shaft and there being control means to vary the torque transmitted between the common drive shaft and the secondary drive shaft.

The secondary drive shaft may be driven from a common drive shaft by a friction drive means.

The friction drive means for the secondary drive shaft may comprise a variable torque capacity friction clutch disposed in the drive path between the common and secondary drive shafts.

The friction clutch may comprise a first element arranged to rotate with one of said drive shafts and a second element connected by a drive transmitting means to the other drive shaft, said first and second elements being relatively movable so as to vary torque transmitting frictional engagement therebetween.

The second element may surround the first element and the elements may be relatively movable to vary the relative position of their axes of rotation to vary the frictional torque transmission therebetween. The second element may be movable between a position in which the axes of rotation of the elements are coaxial or substantially coaxial and a position in which the axes are offset, to vary the frictional torque transmission therebetween.

The first and second elements may be relatively movable by an actuating means.

The actuating means may comprise a fluid operated piston and cylinder means.

The second element may be carried on a pivoted lever which is moved by said actuating means.

The rollers may be mounted on a frame and the pivoted lever may be pivotally mounted on the frame at or adjacent one end of the lever, the actuating means may be engaged with the lever at the other end thereof and the second element may be carried on the lever intermediate said ends.

The first element may be arranged to rotate with the secondary drive shaft.

The second element may be driven from the common drive shaft by a loop drive such as a chain drive or a friction belt drive.

The friction drive means for the rollers may each comprise an elastomeric belt engaged with a roller and with the secondary drive shaft either directly or through an intermediate member which is frictionally rotatably mounted on the secondary drive shaft.

The live roller conveyor may comprise others of said plurality of rollers which are driven from the common drive shaft by a friction drive means which comprises an elastomeric belt engaged with each of such other rollers and with the common drive shaft either directly or through an intermediate member frictionally rotatably mounted on the common drive shaft.

One embodiment of the invention will now be described with reference to the accompanying drawings, in which:-

FIGURE 1 is a plan view, partly broken away and with parts omitted, of a live roller conveyor embodying the invention;

FIGURE 2 is a side elevation of the conveyor of Figure 1;

FIGURE 3 is an end elevation, to an enlarged scale, of the conveyor of Figure 1;

FIGURE 4 is a section, to an enlarged scale, on the line 4-4 of Figures 1 and 3; and

FIGURE 5 is a section on the line 5-5 of Figure 4.

Referring to the drawings, an accumulation station of a powered roller conveyor is illustrated and comprises a pair of side members 10 interconnected by transversely extending members 11 with a plurality of driven cylindrical rollers 12 rotatably mounted between the side members 10 at locations marked L. The rollers define a conveying surface S for articles to be conveyed by a conveying force applied to the articles by the rollers 12. The rollers 12 are provided with a part-circular circumferential groove 13 in which is received an elastomeric belt 14 of circular cross-section and engaged with pulleys 15 mounted on a secondary shaft 16.

The pulleys 15 are mounted for rotation relative to the shaft 16 but the load on the belt 14 is such that friction is exerted between the shaft 16 and the pulleys 15 to such an extent as to provide a drive to the pulleys from the shaft 16 through the pulleys 15 and belts 14. If, however, any one or more of the rollers 12 is prevented from rotation then slipping occurs between the associated pulleys 15 and the shaft 16 to permit continued rotation of the secondary shaft.

The secondary shaft 16 is mounted in bearings 17 mounted on the cross-members 11 to mount the secondary shaft 16 for rotation about a fixed longitudinally extending axis.

The secondary shaft 16 is driven by a friction drive means 18, hereafter to be described, from a common main drive shaft 19 mounted in bearings 17a on the cross-members 11. The main drive shaft 19 extends, through, universal as necessary, joints, along the whole length of the conveyor and is provided, except at the accumulation station or stations of the conveyor, with further pulleys 15

and belts 14 similar to those described hereinbefore to drive the remaining rollers of the conveyor.

The conveyor may be provided with any desired number of accumulation stations and each accumulation station may have one or more secondary shafts 16, the or each shaft 16 may be of any desired length and may drive any desired plurality of rollers. If desired, one or more rollers at an accumulation station may be undriven or may be driven as abovedescribed from the main drive shaft 19. The pattern of rollers which are driven from the secondary shaft 16 and which are either undriven and/or driven from the main drive shaft 19 may be arranged as desired for any particular conveyor application.

The conveyor is provided with an arresting means in the form of a stop 20 movable into an operative position as shown in Figures 1 and 2. When the stop is in its operative position, and an article has been moved into engagement with the stop, or a desired plurality of articles have been moved successively into engagement with each other so as to be arrested, a suitable sensing device is provided to sense the presence of the or any desired number of arrested articles. The sensing means then causes the drive means 18 to disengage the drive between the main common drive shaft 19 and the secondary shaft 16.

The length of each section of the accumulation station over which a secondary shaft extends may be varied as desired to cover any desired number of articles. The number of articles over which a secondary shaft extends will depend upon the maximum end load it is desired to exert upon the stop 20.

Referring now particularly to Figures 4 and 5, the drive means 18 comprises a bush 25 fixed to rotate with the secondary shaft 16 and engageable with a sleeve 26 of friction material fixed to rotate with a pulley member 27 carried by suitable bearings 28, such as ball bearings, on a stub shaft 29 welded or otherwise fixed to a lever 30.

The lever 30 is pivotally mounted relative to one of the side members 10 by a pivot member 31.

The lever 30, at the opposite end to that pivotally mounted on the member 10, is engaged by an operating member 32 of a pneumatic piston and cylinder

means 33. Accordingly, the bush 25 comprises a first element fixed relative to the secondary shaft 16 whilst the assembly of frictional material 26 and pulley member 27 comprise a second element which is movable into and out of torque transmitting frictional engagement with the first element 25 by pivotal movement of the lever 30.

An elastomeric belt 34 is looped around the pulley member 27 and a pulley member 27a which may be fixed or frictionally engaged with the main common drive shaft 19 so as to rotate the second element 27, 26 with the main common drive shaft 19.

Under normal running conditions the pneumatic cylinder 33 is fully energised, that is to say that the operating member 32 is forced downwards so as to force the second element 27, 26 downwards into frictional engagement with the first element 25 to give a high torque transmitting condition in which drive is transmitted to the secondary shaft and hence to the rollers 12 through the belts 14.

When the sensing means senses that the drive should be reduced or interrupted, the pressure in the cylinder 33 is adjusted so that the operating member 32 moves upwardly to a desired extent so that the amount of torque transmission can be regulated as desired down to a completely free condition in which no torque is transmitted.

In a modification, the conveyor may be unprovided with a stop and control means may be provided to control the extent of frictional transmission between the first and second elements so as to control conveyance of the articles in any desired manner.

The features disclosed in the foregoing description, or the following claims, or the accompanying drawings, expressed in their specific forms or in the terms or means for performing the desired function, or a method or process for attaining the disclosed result, may, separately or in any combination of such features, be utilised for realising the invention in diverse forms thereof.

CLAIMS:

1. A live roller conveyor comprising a plurality of rollers driven by friction drives from a common drive shaft wherein at least some of said rollers are driven from the common drive shaft through a secondary drive shaft and there being control means to vary the torque transmitted between the common drive shaft and the secondary drive shaft.
2. A conveyor according to claim 1 wherein the secondary drive shaft is driven from a common drive shaft by a friction drive means.
3. A conveyor according to claim 2 wherein the friction drive means for the secondary drive shaft comprises a variable torque capacity friction clutch disposed in the drive path between the common and secondary drive shafts.
4. A conveyor according to claim 3 wherein the friction clutch comprises a first element arranged to rotate with one of said drive shafts and a second element connected by a drive transmitting means to the other drive shaft, said first and second elements being relatively movable so as to vary torque transmitting frictional engagement therebetween.
5. A conveyor according to claim 4 wherein the second element surrounds the first element and the elements are relatively movable to vary the relative position of their axes of rotation to vary the frictional torque transmission therebetween.
6. A conveyor according to claim 5 wherein the second element is movable between a position in which the axes of rotation of the elements are coaxial or substantially coaxial and a position in which the axes are offset, to vary the frictional torque transmission therebetween.

7. A conveyor according to any one of claims 4 to 6 wherein the first and second elements are relatively movable by an actuating means.
8. A conveyor according to claim 7 wherein the actuating means comprise a fluid operated piston and cylinder means.
9. A conveyor according to claim 7 or claim 8 wherein the second element is carried on a pivoted lever which is moved by said actuating means.
10. A conveyor according to claim 9 wherein the rollers are mounted on a frame and the pivoted lever is pivotally mounted on the frame at or adjacent one end of the lever, the actuating means is engaged with the lever at the other end thereof and the second element is carried on the lever intermediate said ends.
11. A conveyor according to any one of claims 4 to 10 wherein the first element is arranged to rotate with the secondary drive shaft.
12. A conveyor according to any one of claims 4 to 11 wherein the second element is driven from the common drive shaft by a loop drive.
13. A conveyor according to any one of claims 2 to 12 wherein the friction drive means for the rollers each comprise an elastomeric belt engaged with a roller and with the secondary drive shaft either directly or through an intermediate member which is frictionally rotatably mounted on the secondary drive shaft.
14. A conveyor according to any one of the preceding claims wherein the live roller conveyor comprises others of said plurality of rollers which are driven from the common drive shaft by a friction drive means which comprises an elastomeric belt engaged with each of such other rollers and with the common drive shaft

either directly or through an intermediate member frictionally rotatably mounted on the common drive shaft.

15. A live roller conveyor substantially as hereinbefore described with reference to the accompanying drawings.

16. Any novel feature or novel combination of features described herein and/or in the accompanying drawings.

Patents Act 1977

**Examiner's report to the Comptroller under Section 17
(The Search report)**

Application number
GB 9502451.9

Relevant Technical Fields

- (i) UK Cl (Ed.N) B8A A4JA, A4JB
(ii) Int Cl (Ed.6) B65G -13/02, 13/07, 13/071

Search Examiner
B J THOMAS

Date of completion of Search
17 MAY 1995

Databases (see below)

- (i) UK Patent Office collections of GB, EP, WO and US patent specifications.
(ii) ONLINE: WPI

Documents considered relevant following a search in respect of Claims :-
1-15

Categories of documents

- | | | | |
|-----------|---|---------------|---|
| X: | Document indicating lack of novelty or of inventive step. | P: | Document published on or after the declared priority date but before the filing date of the present application. |
| Y: | Document indicating lack of inventive step if combined with one or more other documents of the same category. | E: | Patent document published on or after, but with priority date earlier than, the filing date of the present application. |
| A: | Document indicating technological background and/or state of the art. | &: | Member of the same patent family; corresponding document. |

Category	Identity of document and relevant passages	Relevant to claim(s)
	NONE	

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).